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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,221	08/21/2003	Bruce G. Lindsay	ARC920030007US1	7145

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EXAMINER

LOVEL, KIMBERLY M

ART UNIT PAPER NUMBER

2167

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/645,221

Applicant(s)

LINDSAY ET AL.

Examiner

Kimberly Lovel

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2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/22/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Status

1. Claims 1-52 are pending.
2. Claim 1-52 are rejected.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
5. Claims 1-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,889,231 to Souder et al in view of US PGPub 2003/0088589 to Good et al.

Claim 1:

Referring to claim 1, Souder et al teach a method of data replication. In particular, Souder et al disclose a method of data replication in a distributed computing system (see abstract), said method comprising:

assigning a delta production/consumption value for arbitrary data sources and targets operable for replicating data (see column 7, lines 33-39 – according to paragraph [0003], line 2 of the applicant's specification, delta is a synonym for a change record);

embedding replication tracking information within said data (see column 10, lines 37-45 – the tracking information is sent with the data in a stream; and column 10, line 62 – column 11, line 15), wherein said replication tracking information comprises a timestamp and a contiguous sequence number; and

atomically and independently applying updates at a target site using said replication tracking information (see column 5, lines 30-69 – the system routes specified information to specified destinations or target sites).

However, even though Souder et al teach embedding replication tracking information within the data, Souder et al fail to explicitly teach the further limitation wherein the tracking information comprises a timestamp and a contiguous sequence number. Good et al teach a method for tracking information (see abstract), including the further limitation wherein said replication tracking information comprises a timestamp and a contiguous sequence number (see paragraph [0026]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize Good et al's method of using a timestamp and a sequence

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number to tracking information as a subcomponent to Souder's et al's method of tracking information. One would have been motivated to do so in order to accurately recover information in case the system crashes.

Claim 2:

Referring to claim 2, the combination of Souder et al and Good et al (hereafter Souder/Good) discloses the method of claim 1, further comprising using a capture service at a source site for flow control, wherein said capture service comprises a buffer (Souder et al: see column 9, lines 48-57 and column 11, lines 36-56 – the conventional definition of a buffer is memory the temporarily stores data to compensate for differences in the transfer rate of data from one device to another; therefore, the staging areas are considered to represent the buffer which is responsible for flow control).

Claim 3:

Referring to claim 3, Souder/Good discloses the method of claim 1, further comprising using an apply service at said target site to embed and analyze said tracking information during a crash recovery sequence (Souder et al: see column 10, line 46 – column 11, line 33; and column 41, lines 36-50 – the log and tags are considered to aid in tracking).

Claim 4:

Referring to claim 4, Souder/Good discloses the method of claim 1, further comprising using a monitor service to maintain a state of ongoing replications for status and quality-of-service tracking (Souder et al: see column 10, line 46 – column 11, line 33 – the log and tags track the status and quality-of-service of the replications).

Claim 5:

Referring to claim 5, Souder/Good discloses the method of claim 1, further comprising allowing data sources and targets of arbitrary data formats (Souder et al: see column 5, lines 18-29), including relational DBMSs, files, query results, XML DBMSs to be replicated, through an abstraction of delta (change) production/consumption (Souder et al: see column 3, line 66 – column 4, line 60), and a monotonically increasing timestamp on each said delta (Souder et al: see column 32, line 36 – column 33, line 26).

Claim 6:

Referring to claim 6, Good/Souder discloses the method of claim 1, wherein said replication tracking information is used to determine if a given delta has been previously applied to said target site (Souder et al: see column 32, line 36 – column 33, line 26).

Claim 7:

Referring to claim 7, Souder/Good discloses the method of claim 1, wherein in an event of a crash in said system, said target site requests retransmission of replicated data from said source site beginning at a given timestamp and sequence number (Good et al: see paragraphs [0031]-[0034]).

Claim 8:

Referring to claim 8, Souder/Good discloses the method of claim 1, wherein said sequence number and timestamp are operable to determine if any transaction has been lost during transmission from said source site to said target site, wherein said sequence number is a contiguous series of numbers increasing from 1 to n and said timestamp is

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any monotonically increasing sequence of numbers (Good et al: see paragraphs [0031]-[0034]).

Claim 9:

Referring to claim 9, Souder/Good discloses the method of claim 1, wherein said target site is operable to apply deltas autonomously and independently from said source site (Souder et al: see column 3, lines 66-67 and column 13, lines 1-55 – the system is asynchronous).

Claim 10:

Referring to claim 10, Souder/Good discloses the method of claim 1, wherein said capture and apply services send periodic signals to said monitor service to track a progression of replication for answering status and quality of service queries (Souder et al: see column 19, line 37 – column 20, line 37; column 22, line 43 – column 23, line 35).

Claim 11:

Referring to claim 11, Souder/Good discloses the method of claim 1, wherein said capture service selectively removes replication requests which lag other requests by more than a predetermined permissible amount (Good et al: see paragraph [0031]).

Claim 12:

Referring to claim 12, Souder/Good discloses the method of claim 1, wherein said replicated data further comprises origination tags, wherein said origination tags are operable to prevent duplicate replications of a same data from occurring at said target site via different routes (Souder et al: see column 10, line 62 – column 11, line 15).

Claim 13:

Referring to claim 13, Souder/Good discloses the method of claim 1, wherein said apply service utilizes run-length encoding to compactly describe an interval of timestamps and sequence numbers (Good et al: see paragraphs [0030]-[0031]).

Claim 14:

Referring to claim 14, Souder/Good discloses the method of claim 1, wherein said apply service utilizes an in-memory index when a system crash occurs and a recovery process is initiated by said distributed computing system (Souder et al: see column 43, line 36 – column 45, line 42).

Claim 15:

Referring to claim 15, Souder/Good discloses the method of claim 1, wherein said target site autonomously tracks a progression of replication of said data by maintaining a separate table of applied deltas (Good et al: see paragraph [0026] – a change sequence number is represented by a tuple, therefore it can be considered to be placed in a table).

Claim 16:

Referring to claim 16, Souder/Good discloses the method of claim 15, wherein said separate table comprises an entry, wherein each entry in said table comprises said timestamp and said sequence number of a delta, and wherein said sequence number is operable to determine if a transaction has been misplaced in said distributed computing system (see paragraphs [0026-0028]).

Claim 17:

The method of claim 15, wherein a file-based target site can maintain said table in a separate file and perform atomic updates by writing said file to a disk before updated files are written to said disk (see column 41, lines 36-50).

Claims 18-34, 35-51 and 52:

The program storage device readable by computer of claims 18-34, the data replication system of claims 35-51 and the data replication system of claim 52 are rejected on the same grounds as the method of data replication of claims 1-17.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No 6,763,352 to Cochrane et al discloses using deltas to maintain summary tables.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Lovel whose telephone number is (571) 272-2750. The examiner can normally be reached on M-F from 7:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Homere, can be reached on (571) 272-3780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.


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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kimberly Lovel
Examiner
Art Unit 2167

kml
21 February 2006


JEAN R. HOWERE
PRIMARY EXAMINER